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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/714,649	11/18/2003	Shangir Gwo	MR3029-81	2517
4586	7590	05/06/2005	EXAMINER	
ROSENBERG, KLEIN & LEE 3458 ELLICOTT CENTER DRIVE-SUITE 101 ELLICOTT CITY, MD 21043			LE, DUNG ANH	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 05/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/714,649

Applicant(s)

GWO, SHANGIR

Examiner

DUNG A. LE

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 16-20 is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-15 is/are rejected.
- 7) ☒ Claim(s) 10 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Oath/Declaration

The oath/declaration filed on 11/18/2003 is acceptable.

Specification

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections

Set of claims 1- 10

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1- 9 and 11- 15 are rejected under 35 USC 102 (e) as being anticipated by Chiyo et al. (6,593,016 B1).

Chiyo et al. a method for forming a semiconductor structure, said method comprising:

providing a crystalline silicon substrate 11 (col 17, lines 20-25) having a buffer layer 13/15 thereon (col 17, lines 65, col 18, lines 25- 30), wherein said buffer layer comprising at least two layers 13/15 of distinct material with sharp material transitions and epitaxial alignments between the layers and between the bottom layer of said buffer layer and said crystalline silicon substrate: and

forming a group-III nitride semiconductor structure on said buffer layer 16 (col 18, lines 25- 30).

Regarding claim 2, further comprising performing a surface reconstruction process to said crystalline silicon substrate (col 8, lines 25-40)

Regarding claim 3, wherein said surface reconstruction process comprises a thermal annealing in ultrahigh vacuum (UHV) (col col 11, line 50).

Regarding claim 4, wherein said surface reconstruction process comprises an in-situ hydrogen-plasma cleaning process (col 11, lines 47-50).

Regarding claim 5, wherein said surface reconstruction process comprises an ex-situ wet etching process. (col 5, lines 30-35)

Regarding claim 6, wherein said forming said buffer layer comprises: forming a single-crystal silicon nitride layer on a silicon (111) substrate; and forming a group-III nitride layer on said single-crystal silicon nitride layer. (col 18, lines 20- 25)

Regarding claim 7, wherein said forming said single-crystal silicon nitride layer comprises performing a nitrogen-plasma nitridation to said silicon (111)) substrate. (col 7 ,line65 to col 8, line 10)

Regarding claim 8, wherein said forming said single-crystal silicon nitride layer comprises performing a thermal nitridation to said silicon (111) substrate (col 17, lines 10- 20).

Regarding claim 9, wherein said forming said single-crystal silicon nitride layer comprises performing a chemical vapor deposition to said silicon (111) substrate. (col 7, line 67)

Regarding claim 11, wherein said group-III nitride semiconductor structure is formed by chemical vapor deposition method.(col 7 ,lines 1-5)

Regarding claim 12, wherein said group-III nitride semiconductor structure is formed by molecular beam epitaxy method. (col 4, line 34)

Regarding claim 13, wherein said group-III nitride semiconductor structure is a group-III nitride single layer (col 9, lines 1- 5).

Regarding claim 14, wherein said group-III nitride semiconductor structure is a group-III nitride multiple-layer stricture (col 9, lines 1- 5).

Regarding claim 15, wherein said group-III nitride semiconductor structure is a gallium nitride epitaxial layer (col 3, lines 30-35).

Reasons for Indication of Allowable Subject Matter

Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations.

Chiyo et al. (6,593,016 B1) and Background of Invention , taken individually or in combination, do not teach the claimed invention having (Regarding claim 10) wherein said forming said group-III nitride layer comprises: performing an aluminum pre-deposition process to said single-crystal silicon nitride layer terminated by nitrogen surface adatoms without introducing reactive nitrogen species to form an aluminum pre-deposition atomic layer on said single silicon nitride layer; performing a thermal annealing process to said aluminum pre-deposition atomic layer to form a single-crystal aluminum nitride monolayer on said single-crystal silicon nitride layer; and performing an aluminum nitride epitaxial growth process to said single-crystal aluminum nitride monolayer to form said group-III nitride layer on said single-crystal aluminum nitride monolayer.

Claims 16- 20 would be allowed.

The following is a statement of reason for the indication of allowable subject matter:

Claims 16-20 are considered allowable since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. Chiyo et al. (6,593,016 B1) and Background of Invention, taken individually or in combination, do not teach the claimed invention having the steps of performing an aluminum pre-deposition process to said single-crystal silicon nitride layer terminated by nitrogen surface adatoms without introducing reactive nitrogen species to form an aluminum pre-deposition atomic layer on said single-crystal silicon nitride layer; performing a thermal annealing process to said aluminum pre-deposition atomic layer to form a single-crystal aluminum nitride monolayer on said single-crystal silicon nitride layer and among other steps/limitation as cited in claim 16.

If Applicants are aware of better art than that which has been cited, they are required to call such to attention of the examiner.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is (571) 272-1784. The examiner can normally be reached on Monday-Tuesday and Thursday 6:00am- 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DUNG LE
PRIMARY EXAMINER

DLe